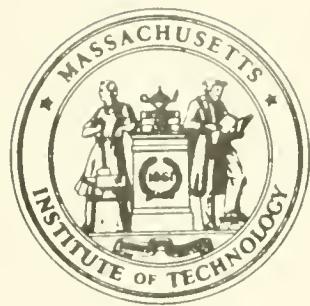


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Feasible Alternatives

For A National Oil Policy

By

Zenon S. Zannetos

July 1977

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Feasible Alternatives for a National Oil Policy*

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My presentation will deal with some feasible alternatives for a national policy with regard to oil.

We are all aware of the events that transpired after October 1973 so I will not burden you with a repetition of all those details. I will, however, dwell on certain lessons to be derived from the recent past and which I consider indispensable for the formulation of an oil policy at the national level. These observations will serve as background assumptions or premises to support the limited number of feasible alternatives available to any single nation.

I. Background

A. Fragility of the "Free" Market Mechanism

One of the first lessons that we have learned is that centralized administrative regulation by any one country or firm in a world which offers decentralized choice, will not work if it does not reflect the results of the decentralized economic consensus of the relevant markets. In a "mixed-enterprise" system any nation or business entity that ignores the economic laws of the marketplace does so at its own peril.

The strength of the "free" market mechanism lies mainly in its universality and efficiency. In the case of complex economies, the process that leads to a market equilibrium is often painfully slow and with the exception of an idealized situation, is not necessarily equitable.

*Presented at the Energy Symposium, Technico Epimeleterio of Greece, Athens, Greece, May 24, 1977.

Administrative regulation on the other hand may bring about fast results, and in the case of national policy may be aimed toward equity, although the universality of the particular notion of equity may be a matter of dispute. In the process, however, administrative regulation will, more often than not, destroy the efficiency of the markets¹ unless such action can effectively change the forces which shape the market supply and demand schedules.² Since my topic is addressing "national policy" I will, unless otherwise qualify, refer to government regulation whenever the latter term is used from here on, although the arguments may be equally applicable to other forms of regulation.

In the case of oil we have seen governments impose taxes, restrict imports and institute multiple pricing schemes, in order to achieve some "stated" objective such as reduction in consumption, conservation of foreign exchange, equitable distribution of the burden imposed by the sudden and enormous price increases of oil after the events of 1973, or increase production. The results have been for the most part disappointing because the emphasis was predominantly on administrative regulation than on the underlying market forces. Instead of increasing the number of effective consumer options available, central regulation for the most part reduced them.

Whenever we have an economic crisis, more often than not, the first solution that comes to mind is more regulation of the private sector. This implies that all economic crises are not only undesirable but that these can and should be prevented, and the fact that they occur is due to some inherent failure of the unregulated part of our society. Hence, the need for more regulation, according to this line of reasoning. And if regulation does not

¹We are not talking, obviously, about natural monopolies.

²Even in cases where regulation effectively changes the nature of the market forces, such as the preferences of people or their life-style, it is questionable as to whether one can legitimately claim that such a solution is efficient, especially for the long run, or even always effective.

work, we have a tendency to try harder and impose more of the same, rather than stop and try to understand "why." Thus regulators tend to self-confirm their expectations that private-sector solutions do not work and that more centralization is necessary.

The market mechanism although delicate and very sensitive to central regulation in the short run, is at the same time long-run resilient. Provided that regulation does not completely destroy the market forces, the latter will tend to adjust over time to the new constraints and seek a new "efficient" solution which may not be consistent with the objectives of the prevailing administrative controls. Unless, therefore, an economy completely shuts off itself from the external environment, it will be eventually forced to relax its administrative grip if the goal of administrative processes is inconsistent with the economic realities of the markets. It is more or less an "all or nothing" situation. A corollary to the above is the following:

In a mixed-enterprise economy or world where choice is preserved, unless society is serious enough about any specific issue to manifest and impose its desires through the "decentralized" market mechanism, in the long run no individual, firm or even nation can afford to unilaterally assume economic burdens and operate differently than the majority. Government regulation can be effective only to the extent that it generates and preserves enough options so that educated choices may be effectively manifested and facilitates the attainment of the decentralized consensus. As for leadership, it can only be defined in terms of the espousal, ahead of anyone else, of a position which although at the time may be controversial, and costly, it eventually prevails. Otherwise, it becomes miscalculation. The recent position of President Carter regarding the sale of plutonium and his subsequent retrenchment, the control of oil and natural gas prices, offshore drilling, nuclear energy and "tanker safety" are some illustrations of the above arguments.

B. The Demand for Oil is Extremely Inelastic in the Short Run

Many professionals have calculated the price elasticity of demand for oil and concluded that the short-run elasticity coefficient is between .025 and .03. For the long-run we have no statistical data to analyze and on top of that many more transient effects enter into the picture and tend to becloud our measurements. If we are generous to assume that the long-run price elasticity of oil is ten times as great as the one manifested in the short-run, we are still faced with a situation where if prices were to double we will see a reduction in demand of only 25 to 30%, and this is not good enough.

The inference here is that we need substitutes, because without them an oil monopoly can extract literally any price for oil it pleases up until it drives others bankrupt. At present the substitution effect of the price change is negligible and the impact of the income effect at the individual level, although severe at the beginning, if the price change is large, diminishes later on as other prices in the affected economies adjust. As long as the oil dependent facilities exist, oil will be used up to the point where its cost is equal to the net incremental value of the output of the fixed facilities and of all the other inputs. In the short run, this net incremental value is quite high, so oil will be used even at higher prices if viable alternatives are not available. The returns to the oil-dependent fixed assets will suffer of course and so will the returns to all those other inputs that are extremely complementary to oil. It is in the aggregate or at the national level that one sees the full impact in terms of inflation, deficits and even unemployment. According to a recent issue of the First Chicago World Report,³ from 1974 to the end of 1976, the OPEC countries, in spite of their increased expenditures, amassed about \$150 billion in current account

surplus. The other side of the balance sheet shows \$72 billion cumulative deficit among the developing countries, due to higher energy costs. The arguments that the oil money is being recycled in the oil consuming countries and that we should not worry about it are not very convincing for three main reasons.

1. Ignoring inflation not all the oil money is recycled in terms of purchases as the ever increasing surpluses indicate.

And even if the money is reinvested in the oil-consuming countries to alleviate problems of currency, the dangers still remain. If the trend continues in the long run the oil producing countries will have claims (equities) to most of the productive assets of the oil consuming nations.

2. The second difficulty with the recycling theory is that even if it were working it would not benefit all countries equally which means that some of them will be driven to poverty at an accelerated rate. Usually the developing countries are those which suffer most.

3. Finally, large purchases by some oil-producing nations which are concentrated over a limited range of products and services, tend to distort the productive capacity of developed countries with the danger of severe recessions and painful readjustments once the expenditure level drops.⁴

I must add here that the economic system cannot absorb smoothly large shocks such as large shifts in expenditure patterns and the quadrupling of oil prices. Its capacity to adjust, which works very well when the changes are small, is impaired when the changes are large and sympathetic pressures

⁴The late sixties and early seventies provide us with a painful reminder of the wastage of resources and the economic distortions which can occur under such circumstances. The defense-electronics and aerospace industries went through a period of severe depression and readjustments when military expenditures were curtailed in the United States.

from other economic sectors and inputs build up to further accentuate large shocks. The inflationary pressures of the October 1973 price increases were, in my estimation, three or four times greater than what were the price changes as a percentage of G.N.P.

C. A Cartel Versus the Many

Another datum that we now have refers to the behavior of the OPEC cartel.

Up until recently when Saudi Arabia and the United Arab emirates refused to go along with the other OPEC members for a 10% price increase, the world was divided facing a monopoly. In the absence of a viable substitute to provide competition on the supply side, the only effective way to face a monopoly, is through a monopsony.

The probability of organizing the consumers of oil into a monopsony is not very great. It is more likely that the oil monopoly will break from internal rather than external pressures. The policy of Saudi Arabia to sell at a lower price coupled with its expressed objective of increasing its output capacity to 16 million barrels a day by 1982 from its present 11 million, will accentuate the pressures within OPEC with one of two possible consequences. Either all OPEC countries will agree to a common price, with possibly Iran and the rest not increasing their price in expectation that Saudi Arabia will gradually raise its prices to catch-up, or an open discount structure and a price war will eventually occur. The present two-tier market structure is unstable and will not last long. Iran is already over extended because of accelerated expenditures in the face of a drop in its sales from a high of 5.9 million barrels per day in 1974 to 5.4 million barrels per day in 1976⁵

⁵These figures exclude local consumption. For total production figures see: Petroleum Economist, May 1977, p. 203 and Federal Energy Administration, Monthly Energy Review, May 1977, p. 84.

and 4.6 million barrels per day in April 1977. Its oil revenues, from an expected \$27 billion per year rate, dropped to below \$20 billion annual rate in April. It is very unlikely that Iran will sit back and watch the erosion accelerate. It will react.

The differences in the immediacy of the needs of the various producing countries is one of the few remaining hopes for the consuming countries as far as oil prices are concerned. Nation to nation negotiations may help to arrange barter trade but that is the extent of any benefit one may expect from such an arrangement.

D. The Oil Markets are by Nature Unstable

If free market conditions were to prevail the oil industry will alternate between periods of feast and famine. The price for oil would then fluctuate between its short-run marginal cost, which even today is not more than a few cents per barrel, and the value of the marginal product into which it goes as an input, which today is not less than \$25-27 per barrel. In short the time profiles of oil prices would look like that of tanker rates.⁶

The differences between the various costs (marginal, full accounting and replacement) at different locations and prices, the time it takes to explore, discover, develop and bring oil fields into production and the difference in distances between the various producing and consuming centers encourage the sale of oil on a delivered basis. Since the price of two shipments of similar oil must be the same at any one market, whether these shipments come from far or near, one can readily understand the logic from the point of view of the producers behind administered pricing schemes, although the price uniformity causes inequities, and the price stability, irrespective of the balance between supply and demand, also causes inefficiencies.

A fifteen-fold increase in tanker rates from trough to peak is not unusual. See Estimated Tanker Market Rates, Single Voyage, Conrad Boe Ltd. A/S, Oslo, Norway, 1976.

E. The Role of Transportation

Transportation performs a very vital role in oil economics but causes a lot of headaches to the oil companies. The reason for this is that it affects the "net back" received by sellers and changes the comparative advantage of oil originating from different locations, whenever tanker rates change. The oil producing countries, who have been shielded all these years by the oil companies from the direct consequences of fluctuating oil tanker rates have not as yet come to realize the full extent of the impact of transportation. And this, because the tanker markets have been depressed since the middle part of 1974 when some oil-producing countries started selling part of their output directly.⁷ What will happen if and when spot rates reach high levels, as in years past, is a matter of speculation and we will come to that shortly.

One thing that we must stress at this point, is that the tanker markets are not controlled by the oil companies or the producing countries, nor is it sensible, from the efficiency point of view, or feasible for anyone in the intermediate future to achieve such control. We are dealing here with a market of about 330 million DWT and over 3,500 vessels. If we are to include the combined carriers the total comes to over 375 million DWT and over 3,900 vessels. Of the

Before the nationalization of oil-producing assets by the oil-producing countries, the concern was that the oil companies would shift their "liftings" from the transportation-intensive crudes of Middle East to the crudes of Venezuela, Libya and Algeria when tanker rates were high and reverse the process when rates were low. To equalize delivered prices, the countries closest to the consuming countries agreed in 1971 to adjust their posted prices upward whenever tanker rates went beyond a certain level. It can be readily seen, that with the great range of tanker sizes (and costs) and the variety of distances involved, that the adjustments do not guarantee equalized delivered prices for the various crudes to any consuming country. As long as the same international oil companies were involved all over the world and had enough profit margins to absorb the differentials the producing countries were shielded from the direct consequences of fluctuating tanker rates. For more discussions see: Zannetos, Z. S., "Persistent Economic Misconceptions in the Transportation of Oil by Sea," Maritime Studies and Management, Vol. 1, No. 2, October 1973, pp. 107-118.

oil tankers in existence as of December 31, 1976 and for vessels of 10,000 DWT and over, private owners owned 2,118 vessels for a total of 204,231,552 DWT versus 1,425 vessels for 114,087,621 DWT for the oil companies.⁸ These figures exclude combined carriers. As for numbers of owners there are over one thousand. These facts indicate that it will take efforts of Herculean proportions to organize a market such as this. For this and for many other reasons, to which we do not have time to devote now, I do not expect OPEC or the oil companies to be able to control transportation in the near future, and even if they wanted to do so.

F. The Incentives and Regulation of Today Unless Removed When the Purpose is Served, Will be an Anathema Tomorrow

Back in the mid-fifties and late-fifties, there was a lot of concern about the stability of the middle Eastern countries. The formation of the organization of petroleum exporting countries, therefore, not only was not opposed but encouraged. At the same time countries such as the United States through certain tax incentives created a climate which encouraged the oil companies not to strenuously oppose the increasing demands of the producing countries, and to also transfer profits upstream. The end result was a subsidy by the American taxpayers, and further encouragement of exploration and production abroad.

What has happened since the formation of OPEC and since October 1973 is now part of history. The lesson that we learn, however, is that some laws and bureaucracies must not be allowed to go beyond their useful life and create crises by their permanence. A fixed period of life, with milestones to be achieved, must be set at inception of any government regulation and administrative

bureaucracy so that abolition may become automatic unless explicitly extended.

We must realize that the political processes are not as consistent as the economic processes, and that the memory of the legislative process is short. In the absence of competitive market forces there is little incentive for efficiency and automatic "weeding" of the inefficient does not take place. On top of this, and especially in democratic societies, policy making, administrative processes and regulatory action tend to function independently of each other to a far greater extent in the public sector than they do in the private sector.⁹ That is why we find public regulation and bureaucracies becoming permanent or extending their life beyond what is necessary.¹⁰

G. The Role of Crises in Motivating Action

Ideally one should plan so as to prevent serious crises. But it is part of human nature to postpone planning, to avoid venturing into the unknown and to delay taking a position about the future, if at all possible. So when things go smoothly or after the passing of time heals the wounds and the shocks of crises are absorbed, the sense of urgency disappears.

There is no sense denying that a crisis is the greatest motivator for action, and that most often than not managerial intervention is crisis oriented. There is, however, one major problem with pure crisis management. People tend to elevate the means used for combatting a crisis to principles and policy, and thus set the foundations for new crises.

⁹ The Chairman of a British firm recently made a statement which is very relevant to the point made here. He said that some countries behave as if the "brain" is separated from the "memory."

¹⁰ Our observations lead us to infer that within the "mixed-enterprise" system, state-owned enterprises are more likely to be efficient if run in the mode of private firms than if operated by government agencies.

We are now getting into a period of false security with possibly no price increases for July 1977 and no foreseeable crises, so I hope that we do not stop our efforts to develop policy alternatives with respect to oil.

I am not as pessimistic as some people are regarding the exhaustion of oil in the next 25 to 35 years¹¹ nor am I as optimistic as some others on the power of any one government to do very much about the oil cartel. But in either case whether we are optimists or pessimists there are certain steps that we can take to make the situation more palatable up until the hold of OPEC on the world economy breaks and/or alternative energy resources become economically and politically viable.

Let me now turn to these policy alternatives.

[I. Long-Run Versus Short-Run Policy]

When talking about policy it is helpful to distinguish between the long-run and the short-run. To the extent that policy refers to the non-changing aspects of a plan, the long-run must cover a time period at least equal to the half-life of the critical (specialized) resources (assets, machinery, equipment) which are necessary for the implementation of such a plan.¹² So for a long-range policy in the area of oil we are talking about a period of at least ten years.

Given that oil-consuming nations are faced with a monopoly and dealing with a depletable resource, a wise policy will be to develop alternatives so that they are not at the mercy of the producers. Even private firms are always uncomfortable with single-source procurement to the point of second-sourcing even their own

¹¹ It is much more likely that oil will become obsolete than be exhausted.

¹² In the case of new facilities the "long run" must cover the life span of the critical assets.

production capability. So in the long run and for a critical resource such as oil, critical for both industrial development and defense, any nation must look toward alternatives. Since others who will follow me to this rostrum will be speaking about energy alternatives, and since my expertise is limited to oil economics and oil transportation, I will not say anything more about long-term alternatives and go to some feasible short-run strategy with respect to oil.

I. Short-Run Policy Alternatives

On the basis of what we have discussed, there are five aspects of short-run policy that seem to hold promise for a country such as Greece. These are:

1. Conservation;
2. Removal of regulatory restrictions which inhibit competition;
3. Build storage facilities for purchasing distressed oil;
4. Charter tankers on a five year basis for transporting the needed crude; and
5. Barter surplus resources for oil.

1. Conservation

No matter how efficient an individual, a household, a firm or an economy is, improvements may still be possible. In the U.S. lowering of the thermostats to 65 f. and installing equipment which optimally turn the heating system on and off, resulted in energy savings of 20% and in some instances 30%.¹³ If we listen to the screeching of tires as the cars race from stop lights, and count the people in them, we realize that we can do better.

¹³ Bolt, Beranek & Newman Inc. of Cambridge, Massachusetts, recently announced that by capturing wasted heat emitted by computers, human beings, and appliances succeeded in heating a new 100,000 square feet building for close to nothing. In the announcement there was no mention of the additional cost, if any, for the structure and equipment which made the savings possible.

Unnecessary trips may be eliminated through better planning without affecting our efficiency and pleasure. We must remember, however, that the demand for petroleum and its products is in the short run very inelastic. For this reason, taxation and rationing promise little for energy conservation. Only if society, i.e., the people consuming energy, are serious enough about the problem will we get results. So the conservation problem is more psychological than economic and that is where policy should concentrate, to shift the demand rather than force the consumers to move up a given demand schedule.¹⁴ Incidentally, there is another possible adverse effect of heavy taxation of black market prices because of rationing. The producing countries seeing that high prices do not discourage consumption may get ideas that further price increases are not only possible but justified.

2. Remove as many monopolistic restrictions as are necessary so that the competitive forces may take some hold

When a nation shields through legislation or regulation a monopoly, it effectively shifts the risk from the seller to the buyer. In other words, it provides an insurance for the producer and forces the consumer to pay the premiums.

Oil is not a natural monopoly realizing extensive economies of scale, like railroads and public utilities. The industry can benefit therefore from competition. We must stress that what is said here applies equally to state-owned firms and state monopolies. Specifically, I hope that the state-owned

¹⁴ Even in the case of industrial users, taxation will not bring about substitution effects in the short run, unless the taxation makes the marginal cost of the existing oil-using facilities greater than the average cost of equipment using alternative energy sources. This approach to "forced obsolescence" which may bring results in the long run is not likely to succeed in the short run because of the magnitude of the price increase which is needed to bring about the necessary obsolescence.

refinery in Greece is allowed to function as an independent firm and expected to perform as efficiently as the best independent refiner. Furthermore, the nation should eventually go out of crude purchases and out of the present arrangements of contracting refining capacities, refining margins, and out of selling products to distributors. As things stand, the nation secures monopolistic privileges for refiners and discourages competition. By viewing the various stages, from crude to products at the pump, as independent stages, the present policy fixes prices and consolidates profits and the consumer does not enjoy any of the benefits of vertical integration.

The national refinery should be also allowed to integrate forward if it finds this move advantageous, as long as it is expected to perform efficiently. It should not, however, be given any privileges that independents do not have.

3. Buying and Storing Distress Oil

Given the economics of oil exploration and production, which under competitive conditions, we characterized as "feast or famine," we would expect discounts and distress shipments of oil whenever surpluses exist. These conditions prevail today, and I foresee such surpluses to be a fact of life off and on for the next five years. At present, on a world-wide basis we have over 15% of shut-in capacity, and over 20% in the Arab OPEC countries.¹⁵ On top of that, most of this shut-in capacity is in Saudi Arabia and Iran, two countries which for diametrically opposite reasons are willing to sell. Whenever imbalances appear between oil produced and scheduled liftings, the oil is offered at a discount. In the past

¹⁵According to FEA figures, in February of 1977 the Arab OPEC countries had 21% of their production capacity shut in, or over 5 million barrels per day. Today the figures are even greater. Monthly Energy Review, Federal Energy Administration, Washington, D. C., May 1977, p. 84.

the discounts were given by the oil companies but in the future these will be offered by oil-producing nations or the national oil companies.

In order to take advantage of these discounts which cannot be negotiated on a long-term basis, unless concealed under barter agreements, one must have appropriate storage capacity, and perform an economic analysis to assess whether the expected discounts for the volumes contemplated can justify the investment and the necessary operating costs. Also, one must be on the look out or have agents looking for appropriate opportunities for action. This means that the yearly purchases must be substantial to justify the necessary storage and administrative costs, and the stored oil must be traded at market prices. Incidentally, part of the stored oil may also serve as a national reserve for emergencies whenever necessary, as long as the nation does not decree that the storage tanks remain full at all times.

One can obtain today a discount of 10-12% on distress oil, which, depending on the inventory turn over may easily cover the storage cost and yield a healthy return on investment.

4. Charter vessels on a five year basis

Another source of saving for any refiner who buys his own oil, is to buy on a F.O.B. basis and provide his own transportation. The reasons for this are as follows:

- (a) To the extent that tanker rates fluctuate from a low of say Worldscale 30 to about 450 oil companies would be selling the oil at quite a discount when rates are high if they sold strictly on a fixed-price delivered basis. In the case of Greece, the above range means an absorption by the oil companies of the difference, or between something like \$5.60 per barrel of oil delivered, when rates are at 450.

To protect themselves against the fluctuations in tanker rates, the oil companies charge, under depressed conditions, AFRA and renegotiate delivered prices reflecting spot rates during periods of high tanker rates. AFRA stands for Average Freight Rate Assessment, is calculated by London Tanker Brokers and is supposed to represent the prevailing cost of transporting oil "during the month ending on the 15th of the month shown, and used by oil companies for pricing purposes during the following month."¹⁶ It is provided for "General Purpose" vessels, "Medium" size, "Large 1," "Large 2" and VLCC. It averages vessels on time charter, owned by oil companies and vessels operating in the spot market.

Because the oil companies tend to charter more vessels and on a longer term basis when rates are high, AFRA normally tends to be higher than spot. In April the AFRA rate was over two times the relevant spot rate.

So considering both periods of high and low tanker rates an average refiner will over the long run pay more for the oil if bought on a delivered basis than if he were to buy on F.O.B. basis and provide his own transportation. As mentioned earlier, in the past, because the international companies enjoyed high margins, and in order to preserve the delivered price system, they would grant the price discounts by absorbing some transportation costs especially under periods of high rates. Now that the margins are mostly reduced to an estimated 22 1/2 cents per barrel, the international oil companies are no longer expected to grant discounts on delivered oil. So F.O.B. purchases would be the most advantageous.

¹⁶Petroleum Economist, London, May 1977, p. 205.

(b) A second part of this suggestion is for a five-year time charter.

The reason for this is that as the owner of a vessel he is relieved of the risks of underemployment and unemployment of his vessel, and he accepts a lower rate the longer the duration of the charter.¹⁷

According to my calculations, the optimal duration of time charters is between five and seven years, depending on the subjective rate of return and the risk aversion of the owner and charterer. For developing countries the optimal point is more likely to be five years because of the high opportunity cost of capital.

(c) Finally, I am proposing that this should be done now or at the latest next year, for I foresee for various reasons a tightening of the tanker market by the end of 1979.¹⁸

Whether we will see the spot rate rise to over Worldscale 400, as we have seen in the past, depends upon whether the oil producing countries sell directly to the refiners rather than through the oil companies. Under any circumstances, however, the time-charter approach whenever there is stability of requirements should be preferred.

I would strongly urge the government to allow the national refinery to consider planning on the above premises.

5. The last short-run policy recommendation is for the nation to negotiate with a producing country to barter some of its surplus resources, such as contract workers, goods and services, for oil. In this way the balance of payment problem will be relieved and possible discounts obtained.

¹⁷ Zannetos, Z. S., "Theoretical Factors Affecting the Long-Term Charter Rate for Tankers in the Long Run and Suggestions for Measurement," SSM Working Paper 118-65.

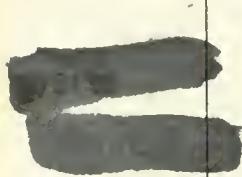
¹⁸ Zannetos, Z. S., "Economic Theory and Ocean Transportation of Oil," SSM Working Paper 880-76.

If this is accomplished, there may be a temptation for the government to establish an oil monopoly, rather than dispose the oil through the private sector. I hope that those involved resist the temptation for the reasons already discussed.

As one may readily observe, the five short-run policy alternatives discussed are not mutually exclusive.

In closing, I wish to reiterate that the only long-run solution is to develop alternatives to oil and encourage the competitive forces of the markets. All the other policy recommendations, such as conservation, buying oil on a F.O.B. basis, chartering tankers on five-year period, building storage capacity to buy distress oil and bartering goods and services, are not aimed at freeing a nation from the bondage of the oil cartel but only mitigating the burdens up until viable long run alternatives are developed.

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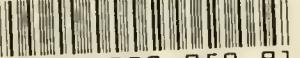
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